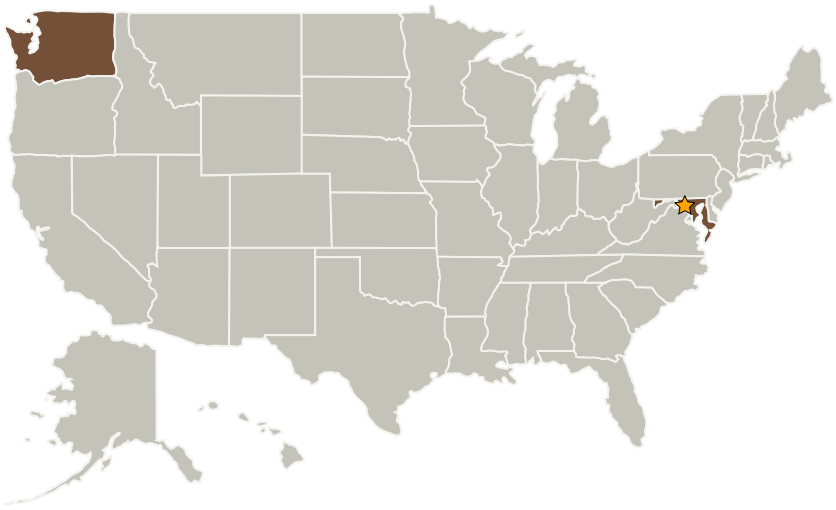
Blocking Filters with Enhanced Throughput for X-Ray Microcalorimetry, Phase I

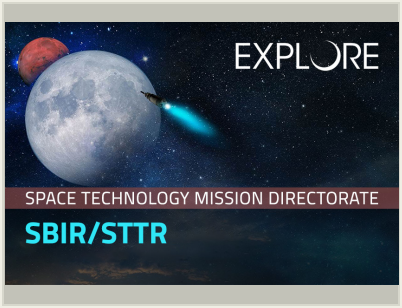
Completed Technology Project (2008 - 2008)

Project Introduction

X-ray microcalorimeters have developed to provide unprecedented energy resolution and signal sensitivity. To take maximum advantage of the microcalorimeter's performance, a new and improved blocking filter stack is needed to further enhance low level sensitivity and mission throughput. The innovation proposed, high transmission polyimide support mesh fabricated using photolithography, will replace the nickel mesh used in previous blocking filter designs. The proposed mesh will be thinner than known comparable supports and will be produced freestanding such that it can be readily combined with filter foils of all types. The polyimide mesh will demonstrate at least 10% higher transmission than nickel at all energies, and will become essentially transparent above 3 keV. Mesh structures will be fabricated using three different photolithographic processes and compared both freestanding and in combination with filter foils to determine feasibility. The proposed innovation along with thinner materials will improve mission throughput and effective area significantly for microcalorimeter payloads on proposed Small Explorer missions, NeXT, and Spectrum-X-Gamma in the near term as well as Constellation-X.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Luxel Corporation	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Friday Harbor, Washington

Primary U.S. Work Locations	
Maryland	Washington

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Mark Hagen

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes